

REDIAGNOSIS OF THE ENDEMIC SOUTHERN AUSTRALIAN GENUS
PARASTACILLA HALE, 1924 (CRUSTACEA: ISOPODA: ARCTURIDAE) WITH
DESCRIPTIONS OF TWO NEW SPECIES

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Abstract

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The arcturid genus *Parastacilla* Hale, 1924 is rediagnosed and a key to its four species presented. All species, *P. triculenta* Hale, 1924; *P. bakeri* Hale, 1924; *P. torus* sp. nov. and *P. tingara* sp. nov. have limited distribution in southern Australia.

Introduction

The arcturid isopod genus *Parastacilla* was erected by Hale (1924) to include two endemic South Australian species *P. triculenta* and *P. bakeri*. Hale distinguished the new genus on the basis of the robust antennae, stout uniarticulate antenna 2 flagellum, flattened anterior pereiopods and unsegmented pleon.

Hale believed that *Parastacilla* resembled *Astacilla* Cordiner to which he assigned some southern Australian species; these now belong to *Neastacilla* Tattersall. The species of *Parastacilla* share many morphological similarities with species of *Neastacilla* from southern Australia: elongation of pereonite 4, an extremely geniculate body between pereonites 4 and 5 and similar sexual morphologies with curved, short appendix masculina and simple penial plate.

Pereopods 2 to 4 of *Parastacilla* are uniquely flattened and sparsely setose. The pereopods of *Neastacilla* species are elongate with closely spaced, long setae. In *Parastacilla* pereopod 2 has a small dactylus and unguis and pereopods 3 and 4 lack a dactylus. Generally, in species of *Neastacilla* pereopods 2 to 4 have a dactylus and unguis. In *Parastacilla* the body is stout and cylindrical while species of *Neastacilla* are elongate and slender. Antenna 2 of *Parastacilla* is stout with a flagellum of two articles; the distal article is very small and bears a claw. Antenna 2 of *Neastacilla* is

slender with two or three flagellar articles of similar lengths. The fusion of the head and pereonite 1, a characteristic of the arcturid family, is extended anteriorly and incised in species of *Parastacilla*; this extension is evident only to a small extent in some species of *Neastacilla*.

The genus was partially redescribed from the types by Hale (1946) but has not been studied since. Two new species have been discovered in collections at Museum Victoria, Melbourne, and the description of these species has uncovered errors in Hale's original generic diagnosis. The types of both *P. bakeri* and *P. triculenta* have been examined to rediagnose the genus and its species. The new species described herein and a survey of museum collections has extended the known distribution of the genus from South Australia to Victoria, Tasmania and Western Australia.

Abbreviations are: NMV, Museum Victoria, Melbourne, Australia; SAM, South Australian Museum, Adelaide, Australia.

Arcturidae Bate and Westwood, 1868

Parastacilla Hale, 1924

Parastacilla Hale, 1924: 209–212.—Hale, 1946: 187–188.

Type species. *Parastacilla triculenta* Hale, 1924 (by original designation).

Diagnosis. Body cylindrical and strongly geniculate. Lateral margins of head and pereonite 1 extended anteriorly and separated by a lateral incision. Antenna 2 stout; flagellum of 2 articles, second article very small with claw and spines medially along length. Maxillipedal palp article 4 narrower than article 3. Pereopod 1 within margin of head; with dactylus barely longer than wide, without unguis, with setae on the medial and oblique distal margin. Percopods 2 to 4 flattened and compact, with paired sparse and widely spaced setae; setae on ischium and carpus shorter than the article. Percopod 2 with very small dactylus present on mesial surface, with unguis (sometimes with secondary unguis). Percopods 3 and 4 dactylus absent. Percopods 5 to 7 progressively shorter; dactylus with primary and slightly smaller secondary unguis (sometimes fused); percopod 5 basis twice length of percopod 6 basis. Pereonite 4 up to 9 times as long as pereonite 3; males with pereonite 4 as long as in

female. Pleon with dorsolateral wings. Uropodal inner ramus with 2 setae of subequal length. Male pleopod 1 exopod laterally notched, with 2 proximal setae of unequal length on posterior face. Male pleopod 2 with appendix masculina short, reaching end of endopod, curved, with ridge on posterior face, apex simple.

Composition. *Parastacilla truculenta* Hale, 1924; *P. bakeri* Hale, 1924; *P. torus* sp. nov.; *P. tingara* sp. nov.

Remarks. The flagellum of the second antenna consists of two articles, not one as described by Hale (1924). Hale believed that all four anterior percopods consisted of six articles, ending in a rounded setose propodus. Examination has shown that in all species the second percopod has a small dactylus and unguis. Some specimens have a secondary unguis on the dactylus of percopod 2.

Key to species of *Parastacilla*

1. Perconites without large dorsal elevations..... *P. truculenta*
- Pereonites with dorsal elevations..... 2
2. Head without dorsal elevation; antenna 2 articles 4 and 5 with tuberculate elevations..... *P. bakeri*
- Head with dorsal elevation; antenna 2 articles mostly smooth, may have some tuberculation..... 3
3. Female pereonite 4 expanded laterally; large anteriorly directed dorsal elevations on perconites 3 and 4; male without elevation on pereonite 3, elevation on pereonite 4 with 2 apices..... *P. torus*
- Female pereonite 4 not expanded laterally; elevations on perconites 3 and 4 of equal size to elevation on head..... *P. tingara*

Parastacilla truculenta Hale

Parastacilla truculenta Hale, 1924: 210–211, fig. 1.—Hale, 1946: 187–188, fig. 15 A.

Material examined. Holotype. South Australia. Beachport, 5–7 m, dredge, H.M. Hale, SAM C237 (1 female, 18.5 mm).

Other material. South Australia. Flinders Island, "The Hotspot" reef, 5 n. miles W of Flinders Island (33°40.80'S, 134°22.50'E), 21 m, large red algae, SCUBA, G.C.B. Poore on FV *Limnos*, 20 Apr 1985 (stn SA-69), NMV J16696 (manca 2, 6.0 mm).

Diagnosis. Female: Head with dorsal elevation. Fusion of head and pereonite 1 indicated by a dorsolateral groove with the lateral margin extended anteriorly and incised laterally. Perconites 2 to 7 smooth. Peronite 4 more than 9 times as long as peronite 3. Perconites 5 to 7 progressively shorter. Pleon length greater than the

combined lengths of perconites 5 to 7; with small dorsolateral wings.

Eyes lateral. Antenna 1 extending to end of peduncle article 2 of antenna 2; uniarticulate flagellum with lateral and distal aesthetascs. Antenna 2 stout, more than half length of body; flagellum of 2 articles and claw, with a medial row of comb-like spines full length.

Percopod 1 dactylus barely longer than wide, without unguis, bearing 2 medial and 3 oblique setae. Percopod 2 with dactylus and unguis. Percopods 3 and 4 without dactylus. Percopods 5 to 7 dactylus with unguis and secondary unguis.

Uropodal exopod oblique, not reaching mid-point of endopod, with 2 distal setae of equal length.

Distribution. South Australia; subtidal.

Remarks. This redescription was based on the holotype (SAM C237). This specimen is an immature female in which the oostegites are not fully formed. Male specimens have not been found. A specimen from Museum Victoria (NMV J16696) is a manca 2 stage: a juvenile with a developed pereopod 7 and undeveloped sexual appendages.

Parastacilla bakeri Hale

Figure 1

Parastacilla bakeri Hale, 1924: 211–212, fig. 2.—Hale, 1946: 187–188, fig. 15 B.

Material examined. Holotype, South Australia. Marino Reef, W.H. Baker, SAM C238 (1 male, 9.5 mm).

Diagnosis. Male: Head with small dorsal elevation. Fusion of head and pereonite 1 indicated by dorsolateral groove with lateral margin slightly extended anteriorly and incised laterally. Pereonite 2 smooth. Pereonite 3 with dorsal elevation. Pereonite 4 about 9 times as long as pereonite 3 with midlength dorsal elevation of similar height to elevation on pereonite 3. Peronites 5 to 7 progressively shorter, smooth. Pleon longer than combined lengths of peronites 5 to 7, with small lateral expansions, small dorsal elevation at two-thirds length and 2 dorsolateral wings.

Eyes lateral. Antenna 1 extending to end of the peduncle article 2 of antenna 2; uniarticulate flagellum with aesthetascs attached laterally and distally. Antenna 2 stout, more than half as long as body, tuberculate elevations with setae on dorsal surface of peduncle articles 3–5; flagellum of 2 articles and claw, with a medial row of spines along full length.

Pereopod 1 dactylus barely longer than wide, without unguis, bearing 2 medial setae and 3 oblique setae on the distal margin. Pereopods 2 to 4 tuberculate. Pereopod 2 with dactylus on medial surface, with unguis. Pereopods 3 and 4 without dactylus. Pereopods 5 to 7 with an unguis and a secondary unguis. Pereopods 5 and 6 dactylus denticulate; pereopod 7 dactylus smooth.

Uropodal exopod not reaching midpoint of endopod, with 2 distal setae of equal length.

Male pleopod 2 appendix masculina with ridge on posterior face, apex simple, curved and short (see *Remarks*).

Distribution. South Australia; subtidal.

Remarks. Hale's original description stated that the type of *Parastacilla bakeri* (SAM C238) was 'mounted in Balsam' and so it was only possible to figure the whole animal and antenna 1. In 1946

Hale re-illustrated the flagellum of antenna 2 and pereopod 1 of what he recorded was the same specimen, apparently not mounted. The specimen (SAM C238) redescribed here was unmounted and undissected before being partially dissected for this redescription. It is possible that Hale's (1946) illustrations were done without any dissecting and mounting. I assume that this is the holotype as a second specimen was never mentioned. The holotype designated by Hale was a male and is the only specimen available.

The appendix masculina was examined in situ from the holotype but not illustrated.

Parastacilla tiugara sp. nov.

Figures 2–4

Material examined. Holotype. Tasmania, Waterhouse Point (40°49.25'S, 47°40.04'E), 5 m, seagrass: *Amphibolus antarctica*, G. Edgar, 24 Apr 1992, NMV J39333 (1 female, 13.5 mm).

Paratype. South Australia, Edithburgh (35°05'S, 137°45'E), 3 m, red algae: *Caulocystis cephalomithos*, hand collection, R.A. King, 14 Mar 1999, NMV J39334 (1 juvenile, 8.0 mm).

Diagnosis. Head with dorsal elevation. Pereonite 3 with dorsal elevation, smaller than elevation on head. Pereonite 4 with elevation, smaller than elevation on pereonite 3. Antenna 2 with some granulation on peduncular articles 3 and 4.

Description. Female: Anterolateral margins of head with small tubercles, rostral point very small. Head with large dorsal blunt elevation, with setae extending out of elevation. Fusion of head and pereonite 1 indicated by dorsolateral groove with lateral margin extended slightly anteriorly and incised laterally. Pereonite 2 smooth with small tuberculate anterolateral extensions, with some dorsal setae. Pereonite 3 with large dorsal elevation of a similar size to elevation on head, with dorsal setae; anterolateral extensions small and tuberculate. Pereonite 4 about 7 times as long as pereonite 3; with row of dorsolateral tubercles along anterior margin and small anterolateral expansions; not markedly wider than previous peronites; with smaller dorsal elevation at midlength, with dorsal setae. Peronites 5 to 7 lateral margins not expanded but slightly tuberculate, progressively shorter posteriorly, dorsal surfaces with numerous setae. Pleon longer than combined lengths of peronites 5 to 7, with small lateral expansions, a small dorsal elevation at quarter length and 2 dorsolateral wings.

Eyes lateral. Antenna 1 extending almost to end of peduncle article 2 of antenna 2; uniarticulate

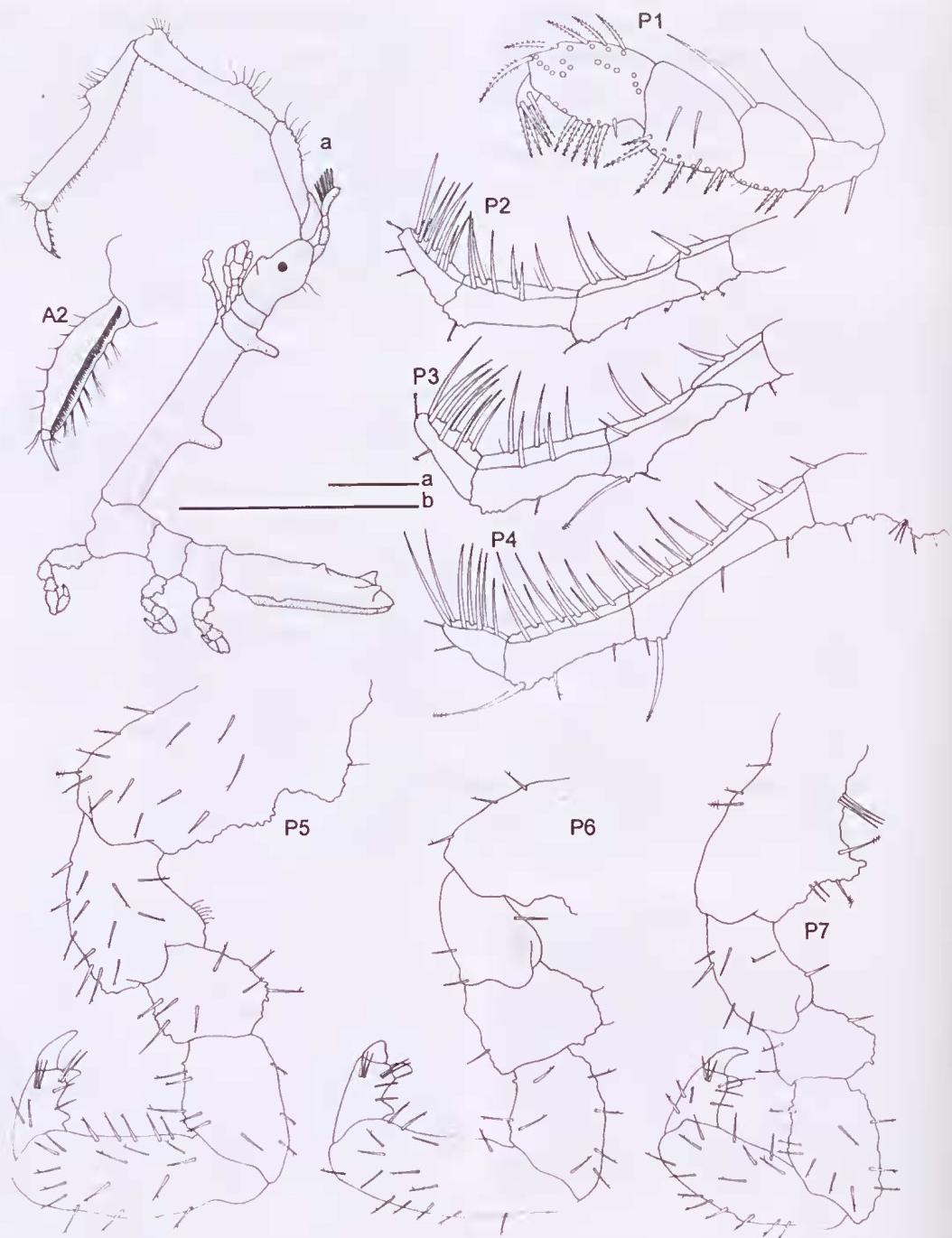


Figure 1. *Parastacilla bakeri* male holotype (SAM C238): a, lateral view; distal end of antenna 2; pereopods 1 to 7. Scales: a = 1.0 mm; b (P1-P7) = 0.5 mm.

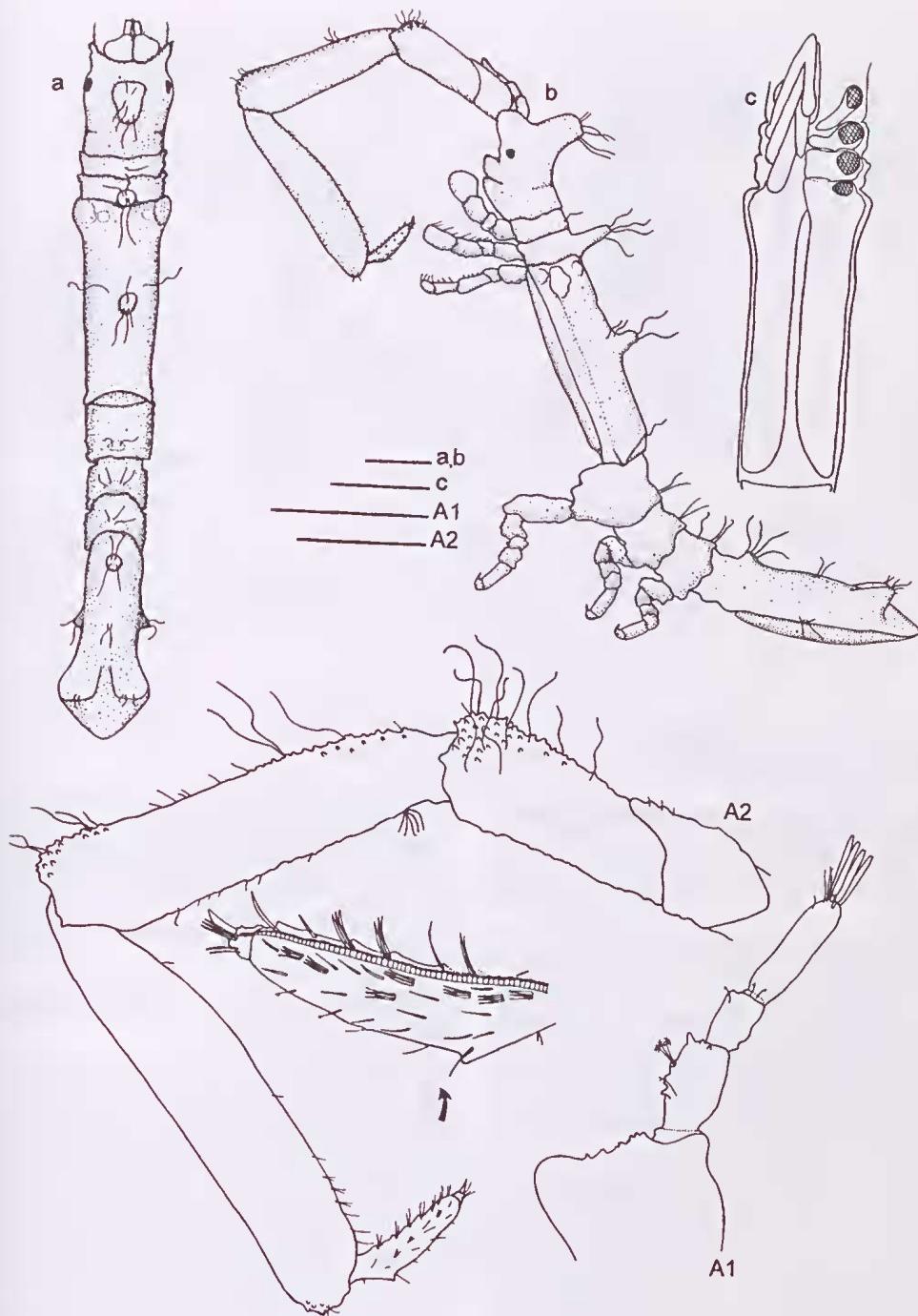


Figure 2. *Parastacilla tingara* female holotype (NMV J39333): a, dorsal view; b, lateral view; c, ventral view with oostegites detailed; antennae 1 and 2. Scales: a, b = 1.0 mm; c = 1.0 mm; A1 = 0.5 mm; A2 = 1.0 mm.

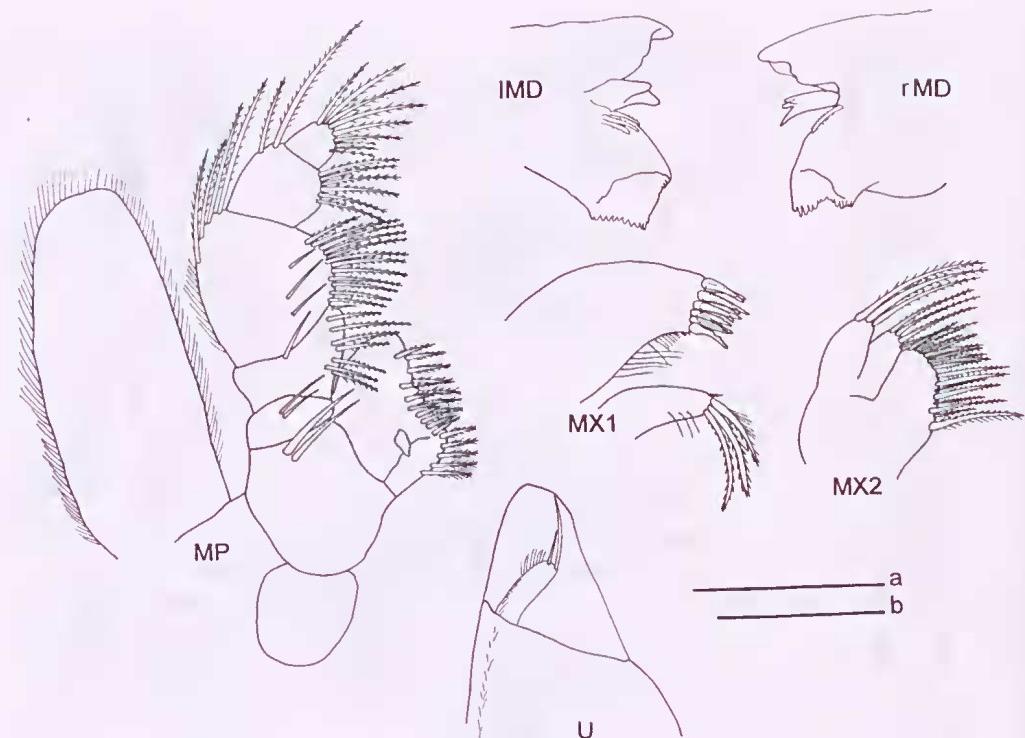


Figure 3. *Parastacilla tingara* female (NMV J39333): mouthparts; distal end of uropod. Scales a (MP, MX1, MX2, IMD, rMD) = 0.5 mm; b (U) = 0.5 mm.

flagellum with distal aesthetascs. Antenna 2 stout, more than half length of body, margins with some tuberculation; flagellum of 2 articles and elaw, with medial row of comb-like spines along full length.

Maxilla 1 inner lobe with 3 terminal setae; outer lobe with 10 distal robust setae. Maxilla 2 inner lobe with 16 plumose setae; middle lobe with 4 setae; outer lobe with 3 setae. Maxillipedal endite with 19 mesial setae; 1 coupling hook present; palp article 2 with mesial setal rows; article 3 with mesial and lateral setal rows; article 4 narrower than article 3 and with mesial and lateral setal rows; article 5 with distal setae.

Pereopod 1 included within margin of head; propodus as long as carpus; daetylus barely longer than wide, without unguis, with 3 medial setae and 3 setae on the distal oblique margin. Pereopod 2 with daetylus, unguis and secondary unguis. Pereopods 3 and 4 without daetylus. Pereopods 5 to 7 with unguis and secondary unguis two-thirds length of primary unguis; daetylus barely denticulate with raised setose area close to daetylus/propodus suture; pereopod 5 basis length twice pereopod 6 basis.

Uropodal exopod oblique, not reaching mid-point of endopod, with 2 setae of subequal length.

Oostegites present on pereopods 1 to 4; oostegite 4 without suture.

Distribution. South Australia to Tasmania; subtidal.

Etymology. "Tingara" is an Australian aboriginal word meaning the sea.

Remarks. This species most closely resembles *Parastacilla bakeri*. Males are generally only slightly smaller than females in this genus but the male specimen of *P. bakeri* is much smaller than the female of *P. tingara* (9.5 mm vs 13.5 mm) and yet both are fully mature. Ornamentation of the head, usually highly species specific, differs between *P. bakeri* and *P. tingara*. Antenna 2 of *P. bakeri* is more slender than antenna 2 of *P. tingara*. The morphology of antenna 2 is usually extremely similar between sexes of the same species. The scales on the antenna 2 flagellum in *P. bakeri* and *P. tingara* are different. *P. bakeri* has simple scales and *P. tingara* has comb-like scales as does *P. torus*. Denticulation of the

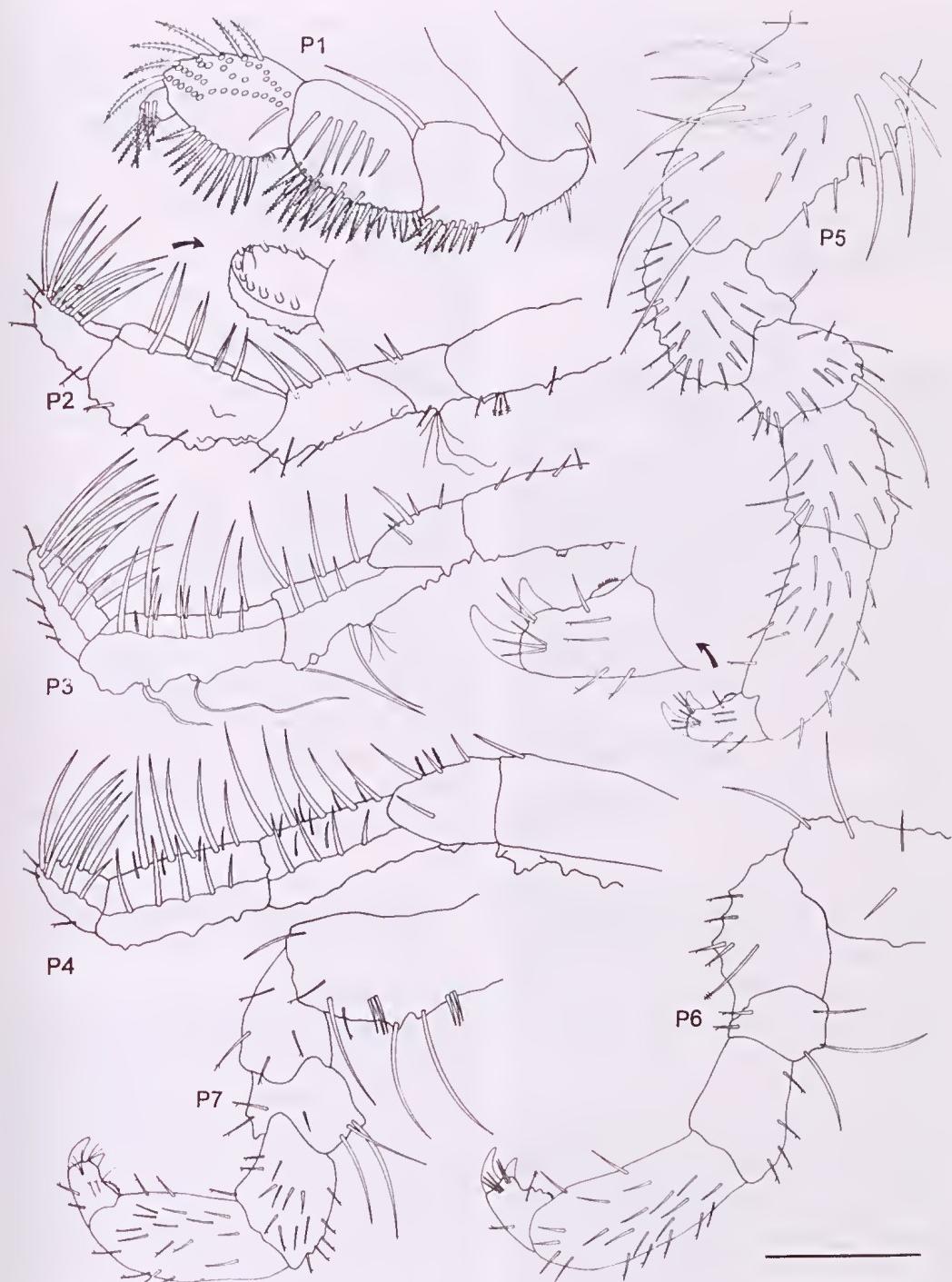


Figure 4. *Parastacilla tingara* female (NMV J39333): pereopods 1 to 7. Scale = 0.5 mm.

daetylus of pereopods 5 to 7 also differs between *P. bakeri* and *P. tingara*. Examination of other species of *Parastacilla* leads me to believe that there may be differences in the denticulation of the daetylus of pereopods 5 to 7 between the sexes but this variation is not as pronounced as the differences between *P. bakeri* and *P. tingara*.

Although the male of *P. tingara* and female of *Parastacilla bakeri* are unknown, I believe the differences between specimens is more than can be expected from sexual dimorphism.

Parastacilla torus sp. nov.

Figures 5–8

Material examined. Holotype. Victoria, Venus Bay ($38^{\circ}39.57'S$, $145^{\circ}42.00'E$), 9 m, SCUBA, 6 Mar 1982, NMV J16691 (1 female, 9.5 mm).

Paratypes. Victoria, Twin Reefs, 11 m, 4 Mar 1982, NMV J16693 (1 male, 6.0 mm). Venus Bay, 8 m, 5 Mar 1982, NMV J16695 (2 juvenile males). Cape Paterson ($38^{\circ}40.22'S$, $145^{\circ}36.53'E$), 6 m, 5 Mar 1982 NMV J16692 (1 juvenile). Harmers Haven, 6 m, 6 Mar 1982, NMV J16690 (2 juveniles). Nepean Bay ($38^{\circ}18.26'S$, $144^{\circ}39.57'E$), 8 Apr 1998, NMV J39297 (1 female, 8.5 mm; 1 immature female, 7.0 mm).

South Australia. Flinders Island ($39^{\circ}52.17'S$ $148^{\circ}01.02'E$), SCUBA, 18 m, 19 Apr 1985, NMV J16688 (1 male, 7.0 mm). "Hoispot Reef", 5 n. miles W of Flinders Island ($33^{\circ}40.80'S$, $134^{\circ}22.50'E$), 21 m, 20 Apr 1985, NMV J16689 (1 female, 8.0 mm).

Tasmania. Pegleg Cove, Deal Island ($43^{\circ}56.31'S$, $147^{\circ}18.59'E$), 8 m, 13 Apr 1983, NMV J16687 (1 male, 6.5 mm).

Western Australia. North Lumps, 2 km Off Mullaloo ($31^{\circ}47.12'S$, $115^{\circ}43.54'E$), 8 m, 2 May 1986, NMV J39296 (1 female, 8.0 mm).

Diagnosis. Head with dorsal elevation. Pereonite 3 in female with an anteriorly directed dorsal elevation. Pereonite 4 in female with large anteriorly directed elevation covering the entire dorsal surface, with anterolateral expansions. Males without the elevation on pereonite 3 or the anterolateral expansions; with a dorsal elevation on pereonite 4 with 2 apices.

Description. Female. Anterolateral margins of head rounded, rostral point very small. Head with large blunt elevation. Fusion of head and pereonite 1 indicated by dorsolateral groove with lateral margin extended anteriorly and incised laterally. Pereonite 2 smooth, lateral margins visible in dorsal view with small tubercles. Pereonite 3 with large anteriorly directed dorsal elevation, half height of elevation on head, lateral margins visible in dorsal view with small tubercles. Pereonite 4 about 8 times as long as pereonite 3; anterolateral expansions rounded and tuberculate,

projecting around pereonite 3; markedly wider than previous pereonites; with large dorsal elevation; small posterior lateral projections also present. Pereonites 5 to 7 relatively smooth with row of tubercles along each posterior dorsal margin; progressively shorter posteriorly. Pleon longer than combined lengths of pereonites 5 to 7; with small anterior lateral expansions, a small dorsal elevation and with dorsolateral wings.

Eyes lateral. Antenna 1 extending midway along peduncle article 2 of antenna 2; small tubercles on dorsal surface of peduncle article 1; flagellum uniarticulate with aesthetes along distal and lateral edge. Antenna 2 stout, more than half as long as body; flagellum of 2 articles and claw, with medial row of comb-like spines full length.

Maxilla 1 inner lobe with 3 terminal setae; outer lobe with 11 distal robust setae. Maxilla 2 inner lobe with 18 plumose setae; middle lobe with 4 setae; outer lobe with 3 setae. Maxillipedal endite with 19 mesial setae; 2 coupling hooks present; palp article 2 with mesial setal rows; article 3 with mesial setal rows; article 4 narrower than article 3, with mesial and lateral setal rows; article 5 with distal setae.

Pereopod 1 included within margin of head; propodus as long as carpus; daetylus barely longer than wide, without unguis, with 3 medial setae and 4 setae on distal oblique margin. Pereopod 2 with small daetylus with unguis and sometimes secondary unguis (see Remarks). Pereopods 3 and 4 daetylus absent. Pereopod 5 to 7 with unguis and secondary unguis, daetylus denticulate; pereopod 5 basis length twice pereopod 6 basis.

Uropod exopod oblique, not reaching midpoint of endopod, with 2 setae of subequal length.

Oostegites present on pereopods 1 to 4; oostegite 4 with suture.

Male: Anterolateral lobes of head rounded, rostral point undetected. Fusion of head and pereonite 1 indicated by dorsolateral groove with lateral margin extended anteriorly and incised laterally. Head with large blunt elevation. Pereonites 2 and 3 smooth, lateral margins not expanded. Pereonite 4 around 8 times length of pereonite 3, with large forward facing dorsal elevation with 2 apices; as wide as previous pereonites; lateral margins not expanded. Pereonites 5 to 7 relatively smooth, lateral margins not expanded. Pleon length greater than combined lengths of pereonites 5 to 7, with small anterior lateral expansions, large dorsolateral wings present.

Eyes small, subtriangular and positioned laterally. Antenna 1 and antenna 2 as for female.

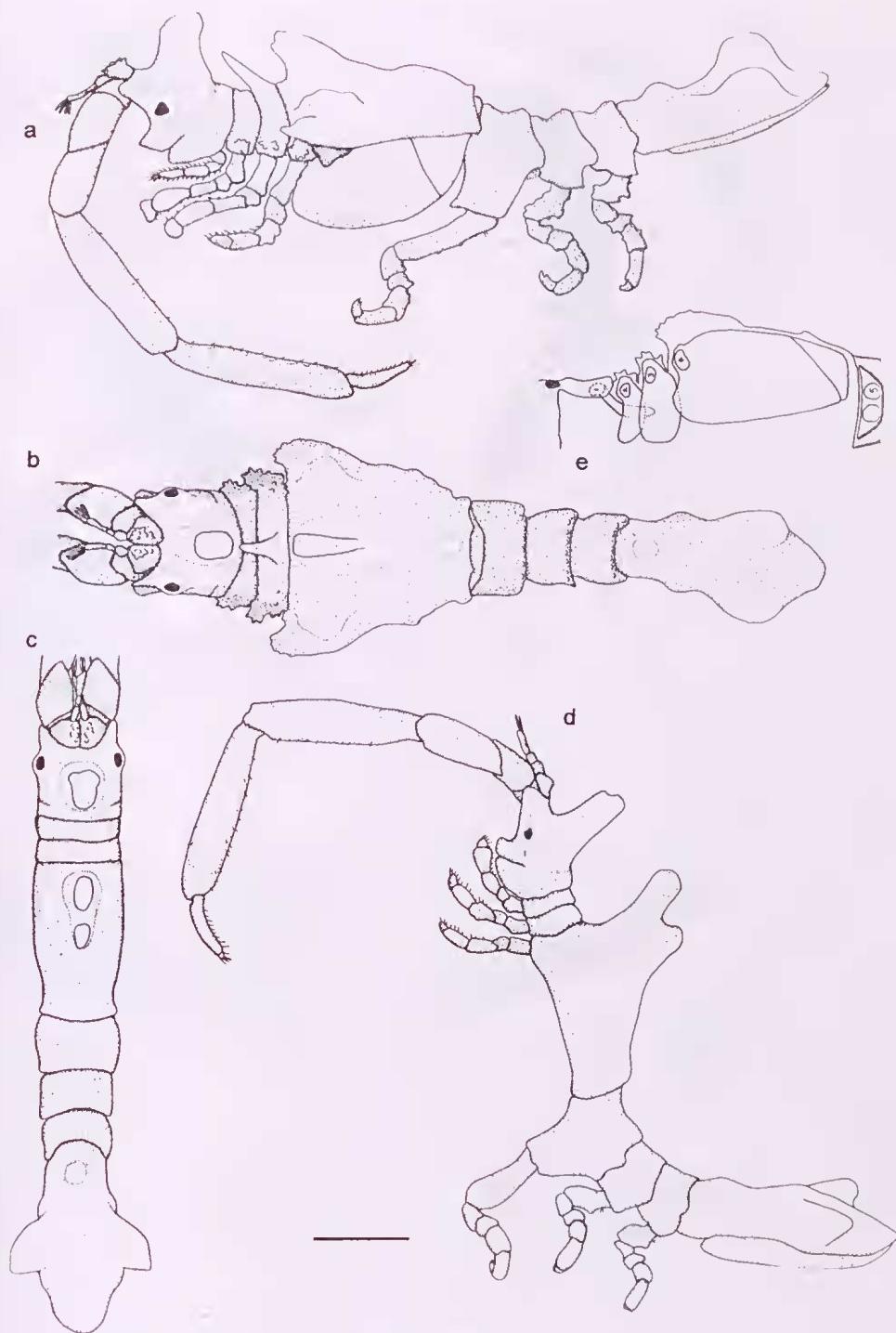


Figure 5. *Parastacilla torus*, female holotype (NMV J16691): a, lateral view; b, dorsal view; e, ventral view with oostegites detailed. Male: c, dorsal view; d, lateral view. Scale = 1.0 mm

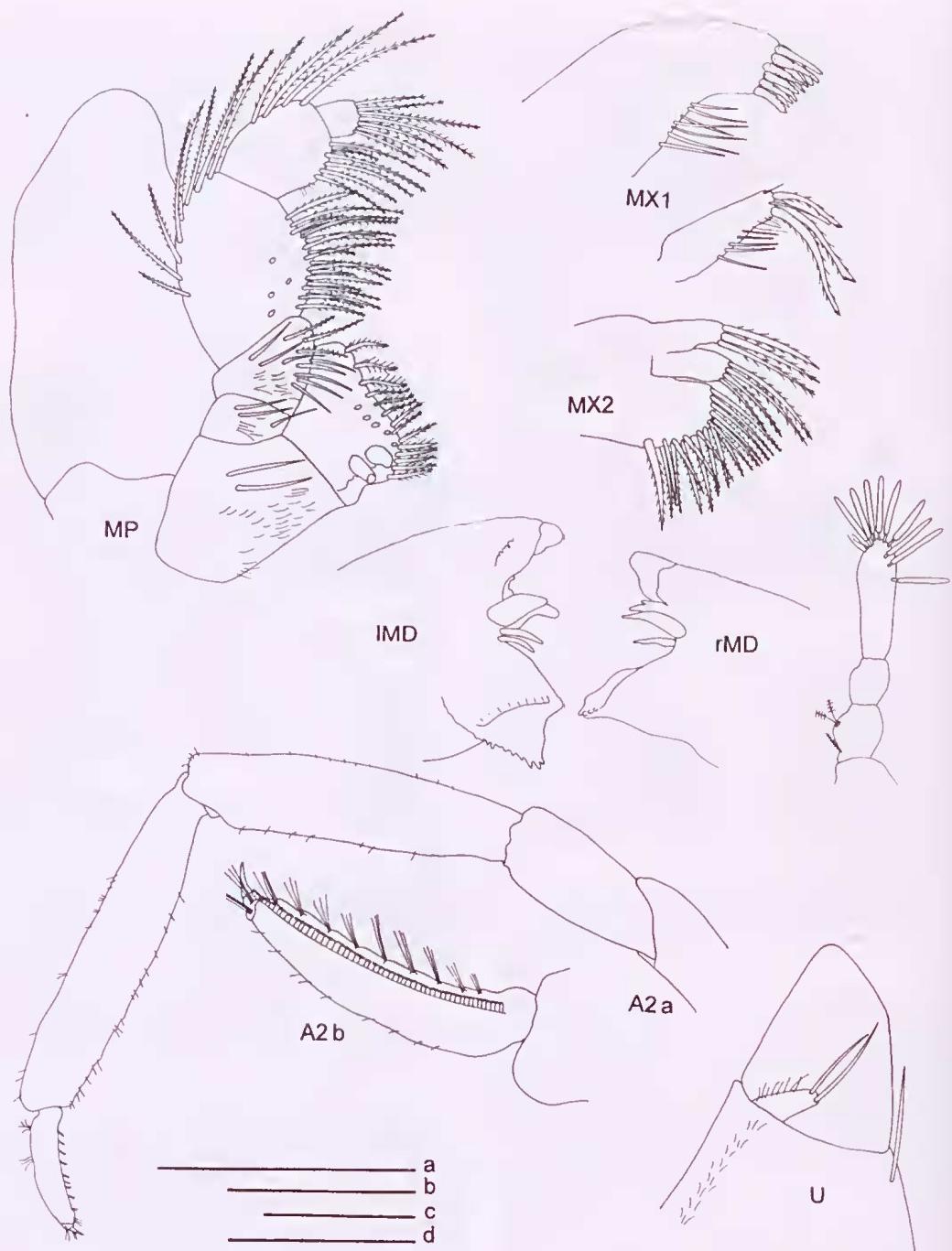


Figure 6. *Parastacilla torus*, female holotype (NMV J16691); left maxilliped, left maxillae 1 and 2, left and right mandibles, antennae 1 and 2, distal end of uropod. Scales: a (MP, MX1, MX2, IMD, rMD, U) = 0.5 mm; b (A1) = 0.5 mm; c (A2a) = 1.0 mm; d (A2b) = 0.5 mm.

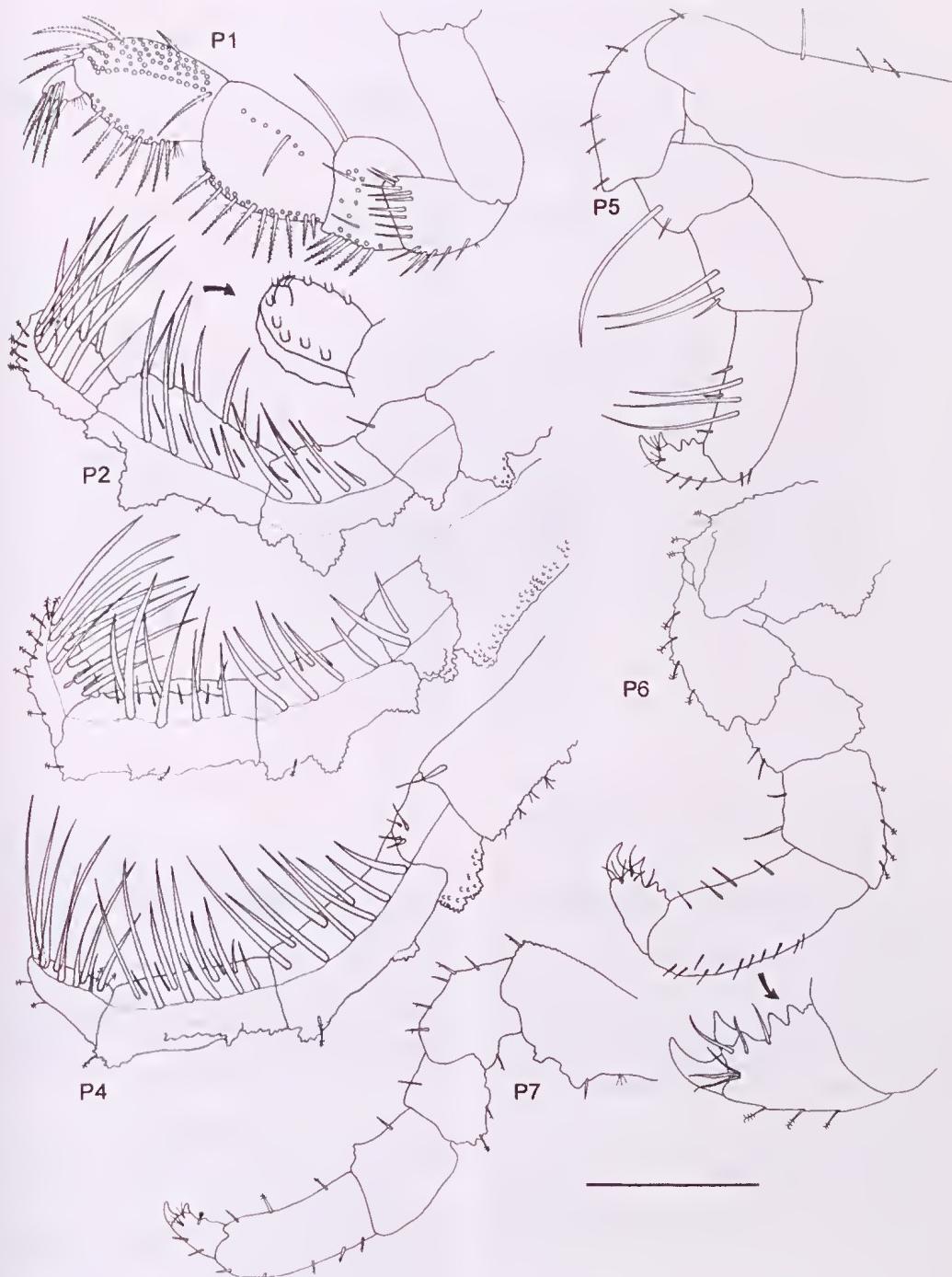


Figure 7. *Parastacilla torus*, female holotype (NMV J16691): pereopods 1 to 7. Scale = 0.5 mm

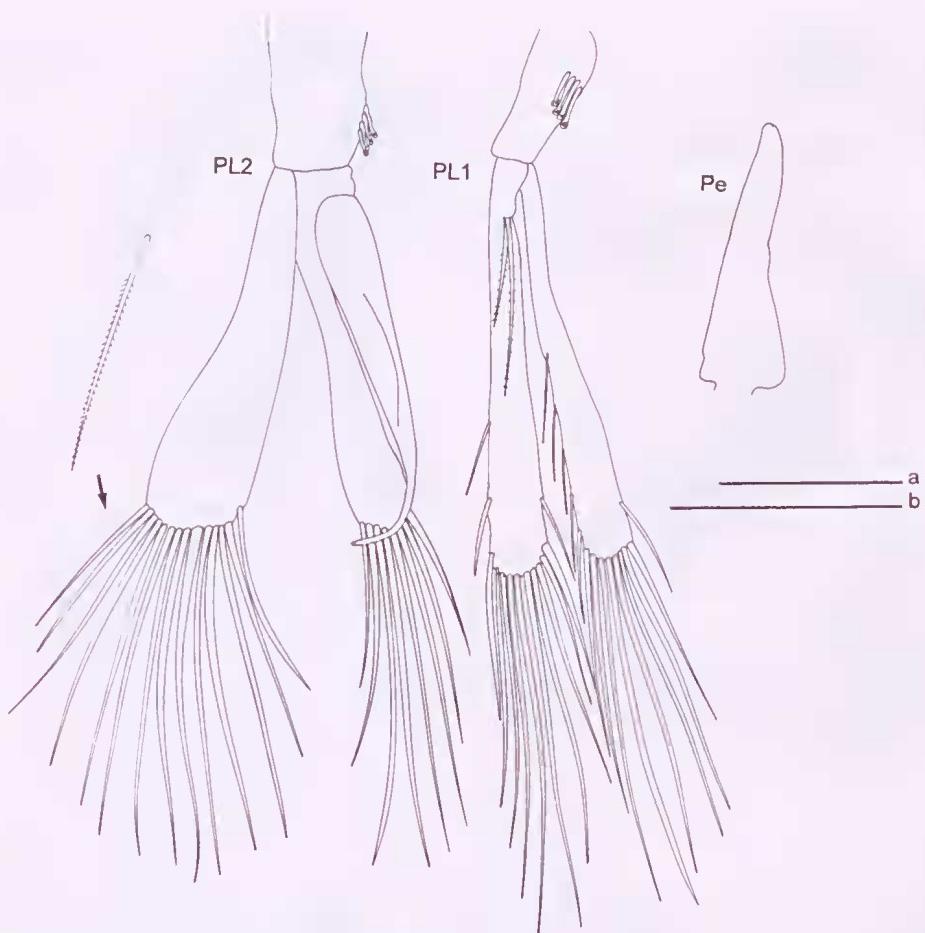


Figure 8. *Parastacilla torus*, male (NMV J16688): pleopods 1 and 2, penes. Scales: a (PL1, PL2) = 0.5 mm; b (Pe) = 0.5 mm.

Mouthparts as for female. Pereopods as for female.

Pleopod 1 exopod with lateral notch and 2 plumose setae of unequal lengths on posterior face. Pleopod 2 appendix masculina with ridge on posterior face, apex simple, curved and short. Penes simple, straight.

Distribution. Tasmania, South Australia and Western Australia; subtidal.

Etymology. "Torus" is Latin for round elevation or protuberance, referring to the ornamentation of the head.

Remarks. Two specimens were found with one unguis on the daetylus of the second pereopod.

Acknowledgments

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